

1. A method of forming an integrated circuit, including
5 forming a dielectric film comprising,
providing a substrate,
providing a CDO film on the substrate, and
treating the CDO film with an electron beam.
2. The method of claim 1 wherein the energy of the
10 electrons in the electron beam is about 3 keV or
greater.
3. The method of claim 1 wherein the energy of the
electrons in the electron beam is about 8 keV or
greater.
- 15 4. The method of claim 1 wherein the energy of the
electrons in the electron beam is determined such that
the predicted Kanaya-Okayama range of the electrons
exceeds the thickness of the CDO film.
5. The method of claim 1 comprising,
20 preparing the CDO film on the substrate by using
chemical vapor deposition.
6. The method of claim 1 wherein the dielectric film is
an interlevel dielectric film comprising,
preparing a damascene structure in the CDO film.

7. The method of claim 6 comprising,
filling the damascene structure with a metal.
8. The method claim 7 comprising,
removing excess metal by using chemical, mechanical
5 polishing (CMP).
9. The method of claim 8 wherein the metal is copper.
10. An integrated circuit, including a dielectric film
comprising a CDO film having a modulus of about 20 GPa
or greater.
- 10 11. The integrated circuit of claim 10 wherein the CDO
film has a dielectric constant of about 2 to about 4.
12. The integrated circuit of claim 10 wherein the CDO
film has a dielectric constant less than about 3.
13. The integrated circuit of claim 10 wherein the CDO
15 film has a density less than about 2 g/cm³.
14. The integrated circuit of claim 10 wherein the CDO
film has a density of about 1.3 g/cm³ to about 1.4
g/cm³.
15. The integrated circuit of claim 11 wherein the
20 dielectric film is an interlevel dielectric film.
16. The integrated circuit of claim 10 wherein the film
has a modulus of about 20 GPa to about 25 GPa.
17. The integrated circuit of claim 16 wherein the
dielectric constant is about 2 to about 4.

18. The integrated circuit of claim 17 wherein the dielectric film is an interlevel dielectric film.
19. An integrated circuit, including a dielectric film comprising a CDO film having a hardness of about 2.8
5 GPa or greater.
20. The integrated circuit of claim 19 wherein the CDO film has a dielectric constant of about 2 to about 4.
21. The integrated circuit of claim 20 wherein the dielectric film is an interlevel dielectric film.
- 10 22. The integrated circuit of claim 19 wherein the film has a hardness of about 2.8 GPa to about 3.5 GPa.
23. The integrated circuit of claim 22 wherein the CDO film has a dielectric constant of about 2 to about 4.
24. The integrated circuit of claim 23 wherein the
15 dielectric film is an interlevel dielectric film.
25. An integrated circuit, including a dielectric film comprising a CDO film having a hardness of about 2.8 GPa or greater and a modulus of about 20 GPa or greater.
- 20 26. The integrated circuit of claim 25 wherein the CDO film has a hardness of about 2.8 GPa to about 3.5 GPa and a modulus of about 20 GPa to about 25 GPa.
27. The integrated circuit of claim 26 wherein the CDO film has a dielectric constant of about 2 to about 4.

28. The integrated circuit of claim 27 wherein the dielectric film is an interlevel dielectric film.